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# MAP THE DISTRIBUTION OF GLACIOFLUVIAL DEPOSITS AND ASSOCIATED GLACIAL LANDFORMS

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16. Abstract Several color composites and good U-2 underflight photographs have been received since the last reporting period. Preliminary visual analysis on new coverage has been initiated. Color-additive and variable intensity viewing of scenes has been accomplished by diverse instrumentation and the Diazo process. Additional work along these lines is planned. Correlation of vegetation patterns to landform is the apparent key factor for achieving the objectives of this proposal, using very small scale imagery and photography.					
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Preface

(a) Objectives: (1) To utilize very small scale imagery for the detection of glacial landforms by employing standard visual airphoto interpretation techniques, (2) to compare various imagery types, scales and formats for optimum data extraction, and (3) to employ color additive, enhancement and projection techniques with various types of equipment to explore the potentials of ERTS imagery for glacial landform data extraction.

(b) Scope: (1) To develop a landform classification system for small scale imagery, (2) compile a surficial geologic map of Maine with emphasis on probable, potential and known glacial deposits of economic importance using ERTS imagery and U-2 support mission photography, and (3) to apply the data to expand the continuing materials inventories studies within the Bureau of Highways.

(c) Conclusions: U-2 support craft photography of portions of the study area (State of Maine) received to date are extremely useful for comparison with ERTS imagery for data extraction. Winter ERTS-1 imagery, received since the last Type II Progress Report period, is of less value in detecting proposal objectives, because of snow cover. However, since vegetation types and seasonal changes are probably a key factor in land form detection on non-stereo very small scale imagery, winter imagery should not be disregarded as a useful aid. A few select cloud-free spring and summer images have been studied in various ways, including color additive, projection and NASA-produced C.I.R. composites. Plans are formulated to use sophisticated electronic gear to establish signatures of land form vegetation cover. These data will be applied to the proposal objectives.

Three color composites of summer imagery, ordered in November 1972 and just recently received, have been partially visually analyzed, as

have four composites made by the General Electric Company Photography Lab. Areas of known outwash formations show a promising correlative effect with vegetation. Additional studies and field checks will be made in these and other areas of diverse terrain types before final reporting.

(d) Summary of recommendations: (1) Speed up transmittal of imagery and retrospective requests to users, and (2) continue sending all good imagery (60% cloud-free or better) of Maine beyond the present stop date of 5/31/73, since good weather days coinciding with orbit passes over Maine have been relatively rare.

## Introduction

The types, formats and quality of imagery and photography on file are summarized. Methods of recording and filing are routine, with only slight modifications from those described in the previous type II report. The use, application, limitations, work performed and proposed work are described. A brief description of limited findings to date is included.

## Imagery and Photography

1. Cloud-free ERTS-1 imagery received since the last reporting period:

(a) 10 Feb. '72, Orbit 'B', 3 scenes

(b) 28 Feb. '72, Orbit 'B', 3 scenes

Have access to the following imagery received by E. G. Stoeckeler (Contract No. NAS5-21772, MMC 0203).

(c) 27 Oct. '72, Orbit 'D', 2 scenes

(d) 2 Dec. '72, Orbit 'C', 2 scenes

(e) 27 Feb. '73, Orbit 'A', 2 scenes

(f) 6 Jan. '73, Orbit 'C', 3 scenes

In addition, several usable scenes having 5 to 20% cloud cover imaged in November 1972 and January through April 1973 have been received, as well as a few scenes having up to 90% cloud cover, which are of no value to this study. It is hoped that more 1973 spring and summer imagery will be available, beyond the 5/31/73 stop date.

2. U-2 support aircraft underflights photography received since the last reporting period:

(a) 27 Jan. a few frames with spotty cloud cover. The mission was aborted as cloud conditions worsened.

(b) 31 Jan., over 500 linear miles of generally cloud-free photography taken along a pre-arranged corridor that includes portions of the six study sites. Three bands of Vinten 70 mm B & W transparencies, 70 mm C.I.R. and 9" RC-10 C.I.R. transparencies were obtained -- all of generally excellent quality.

(c) 24 Mar., about 800 linear miles in four flight lines paralleling and including the coastline. The three B & W Vinten bands were received two days ago, not yet studied in detail. Much of the photography is affected by light cirrus cloud cover, but appears to be quite useable. Vinten and RC-10 color infrared coverage has not been received.

(d) 2 June, a U-2 pre-planned mission covering about 40% of the State of Maine was achieved, with excellent sky conditions, averaging perhaps 15% cumulus clouds.

## Work Performed

In addition to on-going work and ground truth described in this section in the previous Type II report, the following has been done since the last reporting period:

1. Attended the March 5 - 9 ERTS Symposium at New Carrollton, Maryland.
2. The Goddard User Facilities were utilized to make several 35 mm slides of various image composites projected on the I<sup>2</sup>S view screen.
3. The Spectral Data Corp. multispectral viewer at the University of Vermont was made available for use by myself and Mr. Ernest Stoeckeler (P.I. of MMC Nos. 203 & 205) where we tried various imagery-filter-color-intensity combination projections for multidisciplinary uses.
4. Experimentation with the Diazo process is on-going with promising results. 9 x 9" NASA B & W transparencies were only recently received, with more anticipated, to produce inexpensive color composites.
5. About a half day was spent at the CRREL facility in Hanover, New Hampshire and a half day with Dr. Robert Simpson at Dartmouth, observing their various ERTS-related tasks and instrumentation.
6. Comparison of NASA and GE color composites made from Bands 4, 5 & 7 of scenes 1040 - 14543 and 1040 - 14540 imaged 1 September '72.
  - (a) Resolution and clarity of NASA transparencies are superior to GE products.
  - (b) Vegetation correlation with landforms of interest appear to be the key factor for achieving proposal objectives.
  - (c) Select sites were checked against conventional large-scale photography. Field checks will be made of some readily accessible areas.

Program for Next Reporting Period

1. Visual analysis of all available color composites.
2. Field checking of interpretations.
3. Several days will be spent utilizing the General Electric Co. 'GEMS' facility at Valley Forge, Pennsylvania, to analyze imagery.
4. Develop the Diazo technique for composites.
5. The I2S instrument at GSFC User Facilities will be used to further analyze imagery.
6. The Spectral Data Corp. instrument at the University of Vermont will be used to analyze imagery and U-2 photography.
7. Prepare a paper and maps relative to the objectives and findings of this study.

